EMBO reports

science & society

To everything there is a season?

Time, eternity and the promise of extending human life

Donald Bruce

In the Old Testament, an ancient Hebrew philosopher wrote "to everything there is a season, a time for every purpose under heaven. A time to be born; a time to die" (*Ecclesiastes* 3: 1–2). Until recently, humans had little choice but to accept this wisdom and the given aspects of life that lay beyond their control. As Benjamin Franklin once remarked, there is "nothing…certain except death and taxes". Nevertheless, throughout history, medicine has sought to put off death occurring before its due time. With advances in understanding the human body and its processes on a molecular level, however, the possibility has emerged of delaying death well beyond its 'normal' time. If we could extend normal lifespan, it is claimed we should do so. But should we really aspire to live as long as possible, or even, as some speculate, forever?

> The idea of an elixir to keep one forever youthful is as old as Greek mythology and as recent as Harry Potter

The idea of an elixir to keep one forever youthful is as old as Greek mythology and as recent as Harry Potter (Rowling, 1997). In all probability, it remains as far away as it ever did, but this does not stop some searching for it. Two current embodiments of this relentless quest are found in the bizarre claims of the Raelian sect that cloning can make humans immortal, and in transhumanists' speculation that humankind will progressively learn to overcome bodily decay, enabled by a convergence of breakthroughs in different areas of science. These technologically mediated ideas of eternal life contrast greatly with the belief in eternal life of a different order that is found in most major religions, and especially in Christianity. This essay therefore examines some of the problems inherent in the idea of life extension from the point of view of Christianity, by looking at its finitude, extension, ideas of transcendence, eternity and revelation.

For how long are we supposed to live? The answer depends on when and where you live. My grandfather was one of only three children out of seven to survive childhood in a poor crofting community on the Isle of Skye (Scotland, UK) a century ago, which was not unusual. Now, most people in Scotland may reasonably expect to live for 70–80 years. However, in one district of Glasgow, life expectancy is said to be 15 years lower than the Scottish average, due to a combination of many factors that are linked to urban deprivation. In large parts of Africa that are blighted by AIDS and malaria, one might live scarcely half as long.

At the EMBL/EMBO conference on Time & Ageing, Suresh Rattan referred to a framing of human life from the purely secular point of view of evolution (Rattan, page S25). According to this view, we are primarily here to live until we reproduce and thus to pass on our genetic material to the next generation. We continue the survival of our species in general and our line in particular. This gives us an evolutionary purpose for perhaps 50 years, after which the remaining 30 years are just a 'leftover' period. If one takes such a starkly biological and materialist view of the human condition to its logical conclusion, this might lead to some disturbing ethical questions about the place of both the elderly and the reproductively unfit in society.

> It is not clear what modern 'elixir' would provide this extended high-quality life…but it seems unlikely that this would be a provision of any national health service

By contrast, religious understandings paint a more holistic picture of human life. In a Christian view of humanity, the physical, mental, environmental and spiritual are not separate parts but are intimately linked. Length of life is limited not only by physical frailty but also by our moral and spiritual failings. This gives us a strong ethical impetus to heal those who can be healed and to provide care for those who cannot, recognizing the ultimate limits of medicine to cure. Christianity also believes that there is something wrong in this life that needs to be corrected, supernaturally rather than merely naturally. This is also linked to the idea that this life is not all there is, and that there is something beyond death that all humans will ultimately encounter.

There is a fine line between understanding the process of ageing in a medical context and actively seeking to extend the human lifespan. The goal is not so much an elixir of life or a key gene that controls ageing, but perhaps various means of stopping the process of gradual degeneration. Let us suppose for a moment that life is purely material. Extending life beyond a certain point leads to several ethical problems.

First, there is an optimistic assumption that an extended lifespan would be associated, more or less proportionately, with an extension of the physical abilities

of middle age into what we now regard as old age. This seems to be wishful thinking. It sounds laudable to pursue the apparently worthwhile goal of slowing down the ageing process in some functions. But to do this is to cut against the grain of the general degeneration that comes with very old age, which involves such a diversity of functions of body and mind as to be, in effect, inexorable. The most likely practical outcome of extending lifespan would be to inflict on many more people than would otherwise be the case an unpleasant late phase in life, in which a great deal of our faculties were fading, but none of which would cause our immediate death for some considerable time. Unless this could be shown unequivocally not to be the case, I would seriously question the justification of using research budgets and human skills to put more people into what William Shakespeare described, in *As You Like It*, as the seventh age of man: "sans teeth, sans eyes, sans taste, sans everything".

> If the most basic human problems concern our moral and spiritual shortcomings and relationships, then advances in gene therapies, addressing degenerative disease, or correcting failing repair mechanisms would be powerless to address these

Second, even if some continued 'quality of life' might be possible for an extra decade or two, would this be for all or only a few? It seems most probable that it would be for a select, economically advantaged few who could afford it and who lived in, or could travel to, the right country. It is not clear what modern 'elixir' would provide this extended high-quality life—diet, pharmaceuticals, genetic interventions or something else—but it seems unlikely that this would be a provision of any national health service. By contrast, for many of the world's population, living even a full span of life would be a welcome change to their normal expectations. Again, compared with allocating resources and the means to address the causes that truncate the lifespan of the majority of humankind, research into life extension would seem like an unaffordable Western luxury. There may be beneficial by-products of an extended lifespan, but in ethical terms these do not justify what might be an inherently unjust course of action. These two social harms may be seen as unintended consequences of more focused research aims, but they still have to be faced with as much seriousness as would medical side effects.

Is this body and this life all that there is? The final session of the EMBL/EMBO conference was entitled 'Transcendence or Transgressions' and explored several broader dimensions of ageing and life extension. In doing so, it touched on the relationship between the materialist discourse of science and the transcendent discourse of theology. Transcendence is a religious question first before it is a scientific, medical or anthropological one. It asks if this body and this life are all there is. If we were really just material beings, the idea of not existing should perhaps not bother us in a metaphysical sense. The fact that most human beings do seem to be bothered, a Christian would argue, is because God really exists. The fourth-century theologian Augustine said that God made us for Himself, but we have lost our relationship with Him and our hearts remain restless until they find their rest in God (St Augustine, 1991). This is an argument from a position of faith, but is plausible in its own terms. But what are the possible outcomes of death? Consider someone named John Smith who has just died. Several types of outcome are theoretically possible.

Elimination/reconstitution. The individual called John Smith ceases to be, because humans are only material. The chemicals that made up his body are reconstituted randomly.

Generational memory. John Smith lives on in the memories of those people who knew him or were aware of the person he was, but only as long as they themselves live, and only as long or as often as they continue to think of him.

Cultural/intergenerational memory. The cultural memory of particular local or national figures lasts longer, but this is typically restricted to the great figures of history, seminal figures of a culture or legends of a locality. It may be in written records, such as histories, registers and archives, or in oral family trees and stories that are handed down like Norse sagas. Some figures in the creative arts live on through painting, sculpture, photography, poetry, novels, plays, films and so on, in the sense that the great artists and composers are said to "live on" in their work. In the sciences, explorers, discoverers and lawmakers are remembered, such as Columbus, Galileo, Newton, Darwin and Einstein. There are also monuments, such as the statues of Edinburgh's various 'worthy' Victorian figures that line Princes Street. Named buildings and charitable foundations commemorate people symbolically, similar to geographical features such as Mount Everest. But again, each lasts only as long as that culture lasts, or as long as the person is seen as relevant to the culture.

Reincarnation. John Smith's life ceases but passes into the life of another living being, which may or may not be human. His life itself was only a passing phase. What follows does not know that he/she/it was formerly John Smith, and vice versa.

> …to go on and on forever in time, without a relationship with God, is one of the ways in which Christians describe the idea of hell

Spiritual resurrection. According to an American civil war song, John Smith's—or rather John Brown's—body "lies a'mouldering in the grave, but his soul keeps marching on". The spirit or soul lives on in a different dimension, which may or may not connect with the present one. This is a common cultural misunderstanding about Christianity, but is actually more akin to pantheistic beliefs.

Bodily resurrection. This is the Christian teaching that John Smith, if he is a believer in Jesus Christ, will follow the same experience as Christ and will be reborn in a different supernatural dimension. Rather than being only a spirit, he will have a renewed and transformed body, and will still be himself, but physically, morally and spiritually perfected. Only one historical example is cited, that of Jesus, who according to accounts seemed to be of bodily substance, in that he could be touched and ate food, but could also appear out of nowhere, and was sometimes but not always recognizable.

What do we make of life extension in the light of these options? The problems of mere physical extension have been discussed above. More people might know

John Smith personally, but only for a limited time. Suppose he was someone culturally notable: would the culture continue to know him as it once remembered him, or as a shadow of himself, merely awaiting the already-prepared obituary to be published? The categories of reincarnation and resurrection all regard what is done with this life as far more important than how long or short it is. To these, extending life is of little or no consequence.

Is eternal life desirable? Depending on your view, what is the prospect of living for a very long time, or even eternally? I once faced this question in a somewhat bizarre programme for the UK Science Fiction cable TV channel in which several of us were asked what it would be like to live, literally, forever. Once examined, the prospect looked rather unappealling to almost everyone on the programme. Would it be guaranteed that we would live forever young, or only in everlasting old age? If there were too many people to be sustained, it raised major questions about space on the planet, resources, the environment and eventually war. Environmental catastrophe or war might indeed prove self-limiting. It also seemed very unlikely that a high quality of life could be ensured for more than a fortunate few. What would the young do in a generation of thousand-year-old people? Would we go on and on having children? What would we find to do all that time? After spending a few lifespans trying out different things, would we simply get bored? Would we remember what we did 2,000 years ago? The philosopher John Harris has also raised the question of sustainability and goes on to speculate that the most ethical course of action might then be a 'generational cleansing' (Harris, 2000). He postulates that life-extending therapeutics might be offered only on condition that one would not reproduce, or that eventually a commonly agreed end lifespan would be applied, either by suicide or euthanasia or by incorporating a 'death switch' into the therapeutic. Quite apart from the moral repugnance of some of these options, which Harris duly points out, the latter rather defeats the very idea of life extension.

The physicist Richard Seed, in a well-publicized interview in 1998 (McKie, 1998), and the Raelian cult have both proposed cloning oneself as a way to achieve eternal life. This, however, perpetuates a basic error. Cloning may pass on a life, just as we pass life on to our children, but it would not be our own life. The clone would be a different person—our twin, a generation removed. Its true biological parents are its grandparents. Only the genes would be transmitted, and even these would not stay the same over time. Moreover, except in the case of a female clone that was created from both the egg and body cells of the same woman, the mitochondria would be different. Cloning is closer perhaps to the idea of reincarnation than eternal life.

To address the question of ageing and life extension merely as a technological challenge starts with too limited a premise of humanity. We are more than just our physical identity, genes and bodily functions. Even aside from the more extreme suggestions, any technical fixes to our

Georges de la Tour (1640–1645) *La Madeleine à la veilleuse* (Magdalena with the night light). Original: Musée du Louvre, Paris, France. Photo: Gérard Blot, RMN, Paris, France. With permission from bpk, Berlin, Germany.

mortality carry another basic fallacy. They would not create eternal life, as is understood in a religious sense. In a Christian context, simply going on and on living is not what Christ meant by eternal life. Eternal life has quality as well as timelessness, and a central idea in most religions is that life as we know it has something wrong with it.

It was postulated during the conference that there seems to be no biological limit to the end of life as such. This suggests a modern ring to an old question, namely, is there something non-physical that shortens human life? Can it be said, as in the Judaeo-Christian tradition, that there is something spiritually wrong with humans, compared with what God intended us to be? The ancient writings of the Hebrew Bible describe a progressive decrease in age at death, in parallel with a general moral and spiritual decline, which culminates in the divine declaration, "My spirit will not remain in man for ever. He is corrupt. His days will be 120 years" (*Genesis* 6: 3). Whatever interpretation is made of the long age spans in the book of Genesis, the philosophical point is deeply significant.

Insofar as our wellbeing is linked to correct behaviour and relationships, our life expectancy is affected if they are wrong. If the most basic human problems concern our moral and spiritual shortcomings and relationships, then advances in gene therapies, addressing degenerative disease, or correcting failing repair mechanisms would be powerless to address these. An intrinsic fault line in humanity would remain between the noble and ignoble sides of both human nature and our dealings with each other.

Christianity, which is the only tradition on which I feel qualified to comment, asserts that the most basic relationship is with the creator and sustainer of the universe, but that we have lost it by pursuing human autonomy. If this is what humans were made for, then the dream of improving humans is an illusion because, according to Jesus, it is what is in our hearts that spoils us (*Matthew* 15: 18–20). In this context, eternal life thus has a different meaning from merely living forever. According to Jesus, eternal life is 'knowing God' (*John* 17: 3). He described this as life in all its fullness, compared with life without a relationship with God, which has a dimension missing, like life in black and white instead of in colour. Eternal life is also portrayed as something that begins imperfectly but is transfigured at death, after which perfect relationships with God, each other and the cosmos are restored. This is a realm beyond time, and in that sense is inherently unknowable from the perspective of time. Indeed, to go on and on forever in time, without a relationship with God, is one of the ways in which Christians describe the idea of hell.

Recent scientific advances—such as the mapping of the human genome and stem-cell research—have been promoted on the promise of new understandings of our humanity and untold potential progress in addressing disease. There is an 'emperor's new clothes' aspect to this rhetoric, because we will all still die of some cause eventually. If death is a natural part of the human condition as we now know it, it puts an eventual limit on medical research, given that resources are limited. I suggest that more immediate priorities exist, given that so many of the world's population do not reach a full lifespan. But the idea of fixing ageing technologically misses the point. Research should not be justified on the premise that we can cheat death for a bit longer, if it diverts humans from facing up to their own mortality. Ultimately, there is a time to be born, and a time to die.

REFERENCES
Harris J (2000) Intimations of immortality. *Science* **288:** 59
McKie R (1998) *Fears of a Clone.* Interview with Richard Seed, *The Observer*, Jan 11, p23
Rowling JK (1997) *Harry Potter and the Philosopher's Stone.* London, UK: Bloomsbury
St Augustine (1991) *Confessions* (Chadwick H, translation). Oxford, UK: Oxford University Press

Donald Bruce is Director of the Society, Religion and Technology Project of the Church of Scotland, Edinburgh, UK.
E-mail: srtp@srtp.org.uk

doi:10.1038/sj.embor.7400423